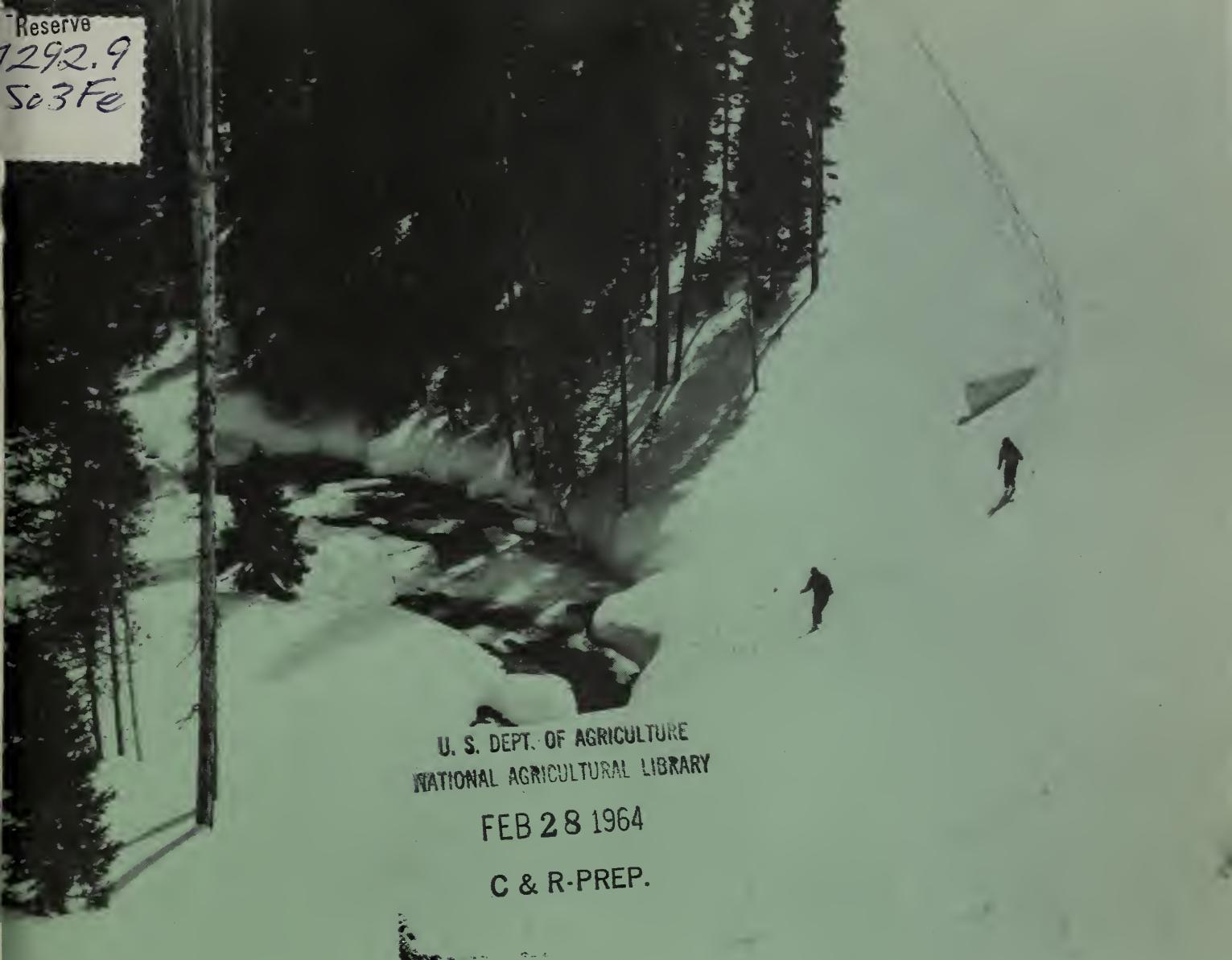


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C & R-PREP.

WATER SUPPLY OUTLOOK

and

FEDERAL - STATE - PRIVATE COOPERATIVE SNOW SURVEYS

for

WASHINGTON

UNITED STATES DEPARTMENT of AGRICULTURE...SOIL CONSERVATION SERVICE,

and

DEPARTMENT of CONSERVATION STATE of WASHINGTON

Data included in this report were obtained by the agencies named above in cooperation with the U.S. Forest Service, U.S. Geological Survey, National Park Service, and other Federal, State and private organizations.

AS OF
MAY 1, 1963

UNITED STATES DEPARTMENT OF AGRICULTURE - SOIL CONSERVATION SERVICE

To Recipients of Water Supply Outlook Reports:

The climate of the cultivated and populated areas of the West is characterized by relatively dry summer months. Such precipitation as occurs falls mostly in the winter and early spring months when it is of little immediate benefit to growing crops. Most of this precipitation falls as mountain snow which stays on the ground for months, melting later to sustain streamflow during the period of greatest demand during late spring and summer. Thus, nature provides in mountain snow an imposing water storage facility.

The amount of water stored in mountain snow varies from place to place as well as from year to year and accordingly, so does the runoff of the streams. The best seasonal management of variable western water supplies results from advance estimates of the streamflow.

A snow survey consists of a series of about ten samples taken with specially designed snow sampling equipment along a permanently marked line, up to 1000 feet in length, called a snow course. The use of snow sampling equipment provides snow depth and water equivalent values for each sampling point. The average of these values is reported as the snow survey measurement for a snow course.

Snow surveys are made monthly or semi-monthly beginning in January or February and continue through the snow season until April, May or June. Currently more than 1400 western snow courses are measured each year. These measurements furnish the key data for water supply forecasts.

Streamflow forecasts are obtained by a comparison of total or maximum snow accumulation, as measured by snow water equivalent, to the subsequent spring and summer or snowmelt season runoff over a period of years. The snow water equivalent measured in selected snow courses provides most of the index to the streamflow forecast for the following season. More accurate forecasts are usually obtained when other factors such as soil moisture, base flow and spring precipitation are considered and included in the forecast procedure. Early season forecasts assume average climatic conditions through the snowmelt season.

Listed below are the Federal-State-Private Cooperative Snow Survey and Water Supply Forecast reports available for the West which contain detailed information on snow survey measurements, streamflow forecasts, reservoir storage, soil moisture and other guide data to water management and conservation decisions. Soil Conservation Service Reports may be secured from Water Supply Forecasting Unit, Soil Conservation Service, P.O. Box 4170, Portland 8, Oregon.

PUBLISHED BY SOIL CONSERVATION SERVICE

<u>REPORTS</u>	<u>ISSUED</u>	<u>LOCATION</u>	<u>COOPERATING WITH</u>
RIVER BASINS			
WESTERN UNITED STATES			
MONTHLY (FEB.-MAY)	PORTLAND, OREGON	ALL COOPERATORS	
STATES			
ALASKA	MONTHLY (MAR.-MAY)	PALMER, ALASKA	ALASKA S.C.D.
ARIZONA	SEMI-MONTHLY (JAN.15 - APR.1)	PHOENIX, ARIZONA	SALT R. VALLEY WATER USERS ASSOC. ARIZ. AGR. EXP. STATION
COLORADO AND NEW MEXICO	MONTHLY (FEB.-MAY)	FORT COLLINS, COLORADO	COLO. STATE UNIVERSITY COLO. STATE ENGINEER N. MEX. STATE ENGINEER
IDAHO	MONTHLY (JAN.-JUNE)	BOISE, IDAHO	IDAHO STATE RECLAMATION ENGINEER
MONTANA	MONTHLY (JAN.-JUNE)	BOZEMAN, MONTANA	MONT. AGR. EXP. STATION
NEVADA	MONTHLY (JAN.-MAY)	RENO, NEVADA	NEVADA DEPT. OF CONSERVATION AND NATURAL RESOURCES - DIVISION OF WATER RESOURCES
OREGON	MONTHLY (JAN.-JUNE)	PORTLAND, OREGON	OREG. STATE UNIVERSITY OREGON STATE ENGINEER
UTAH	MONTHLY (JAN.-JUNE)	SALT LAKE CITY, UTAH	UTAH STATE ENGINEER
WASHINGTON	MONTHLY (FEB.-JUNE)	SPOKANE, WASHINGTON	WN. STATE DEPT. OF CONSERVATION
WYOMING	MONTHLY (FEB.-JUNE)	CASPER, WYOMING	WYOMING STATE ENGINEER

PUBLISHED BY OTHER AGENCIES

<u>REPORTS</u>	<u>ISSUED</u>	<u>AGENCY</u>
BRITISH COLUMBIA	MONTHLY (FEB.-JUNE)	WATER RIGHTS BR., DEPT. OF LANDS, FORESTS AND NATURAL RESOURCES, PARLIAMENT BLDG., VICTORIA, B.C., CANADA
CALIFORNIA	MONTHLY (FEB.-MAY)	CALIF. DEPT. OF WATER RESOURCES, P.O. BOX 388, SACRAMENTO, CALIF.

FEDERAL-STATE-COOPERATIVE
SNOW SURVEY AND WATER SUPPLY FORECASTS
For
WASHINGTON

Report Prepared
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U. S. Department of Agriculture

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Department of Conservation
State of Washington

WATER SUPPLY OUTLOOK

State of Washington
May 1, 1963

COLUMBIA MAINSTEM

The Columbia is expected to flow during the May-September period 89% of normal at Birchbank, 85% of normal at Grand Coulee, 82% of normal below Priest Rapids Dam and 75% at The Dalles.

PEND OREILLE-SPOKANE RIVERS

Snow courses in the Pend Oreille drainage that were measured near May 1 show a snowpack that is considerably below normal but improved over that which was reported last month. The snow courses in the Spokane drainage did not show as much improvement as those in the Pend Oreille. Flows of both of these rivers were well below normal during the month of April. The Pend Oreille flowed 76% and the Spokane 67%. This resulted in an increase of the forecasted residual flows for both streams. It is now expected that the Pend Oreille will flow 79% or 11,200,000 for the May-September period and the Spokane 76% or 1,610,000 acre feet during the same period.

COLVILLE-KETTLE RIVERS

The Colville-Kettle watersheds continue to be the two bright spots in the state. Prospective water supplies in these areas can be considered good. Forecasts for the Kettle River near Laurier for the May-September period are for flows 81% of normal or 1,345,000 acre feet. The Colville River as measured at Kettle Falls is expected to have a flow 85% of normal or 87,000 acre feet during the May-September period.

Precipitation in this area has been better than 150% of normal during the month of April. Precipitation which occurred during the month of April fell primarily as rain throughout the complete watershed. The snow courses in the Canadian portion of these drainages have a snowpack that is very close to what occurred last year at this time but considerably less than what happened in 1961. Records of snowfall are not long enough for a normal to be computed.

OKANOGAN-METHOW RIVERS

The outlook for irrigation water supplies in these watersheds has generally improved over that which was reported last month. Heavy snow fell in the Washington portion of the drainage and this has brought many of the snow courses in this area very close to a May 1 normal. Precipitation as measured in Conconully was 350% of normal, indicating the extensiveness of the snowfall in the upper watershed. This area to the north in British Columbia did not experience as great an increase in the upper watersheds as occurred down here. Valley precipitation in British Columbia ranged up to 320%, but snow recorded on the snow courses did not indicate this high percentage.

The situation, according to the snow cover measurements, is now generally better than was reported at this time last year but snow courses still have a much below normal snowpack over the watershed as a whole. Reservoir storage should still be watched very carefully as in all likelihood this late season snowfall will come off early in the season. Reservoirs that are not now full should fill completely with the early runoff and still leave sufficient water for irrigation purposes. The one soil moisture station in British Columbia indicates that the moisture has penetrated into the soil mantle to the first foot. The remaining portion of the soil mantle is still very dry.

The mainstem of the Okanogan and Similkameen drainage is expected to have a flow that is 61% of normal for the Similkameen, 58% for the Okanogan at Oroville and 60% for the Okanogan at Tonasket. These are flows for the May-September period of 930,000, 390,000 and 1,060,000, respectively. The forecast for the inflow to Salmon Lake at Conconully is still for 11,000 acre feet or 48% of normal.

On the Methow River drainage the snow cover increased more markedly than the other watershed in this area but the overall effect is still considerably below normal. Forecasts are for flows of 720,000 acre feet or 69% of normal for the May-September period.

WENATCHEE-CHELAN-ENTIAT RIVERS

The storms which occurred during the month of April were a considerable help in alleviating some of the short water supply potential in the lower reaches of the Wenatchee River and Chelan Lake drainage. While this precipitation has wetted up the soils at lower elevations to near capacity, the snowpack that should have been there during the winter is gone for all practical purposes. The storms which have occurred are

such that streamflow can be expected to be good during the earlier part of the irrigation season and unless reservoir storage is available farmers could experience water shortages during the latter part of the irrigation season. Subsequent precipitation and temperatures, of course, are deciding factors in this case.

Snow survey measurements which were made near the first of May indicate a snowpack considerably improved percentagewise over that which was measured on the first of April but still well below the 1943-57 base period. Many of the low elevation snow courses are bare and some of the courses at the medium elevation range which normally can expect some snow are bare also.

Forecasts of these areas are for flows 68%, 73%, 65% and 61% for the Chelan, Stehekin, Wenatchee at Plain and Wenatchee at Peshastin, respectively. These are all percentages of the 15-year average for the May-September forecast period. Forecast for the Stemilt basin has not been changed from that which was reported last month.

YAKIMA RIVER

The outlook for irrigation and water supplies has improved from that which was reported on April 1. This improvement has been due in part to the above normal precipitation which has occurred in the valley stations of most of the watershed, below normal river flow during the month of April and indications of improved situations on many of the snow courses.

Reservoir storage in this area is well above normal and very near to the usable capacity. The soil moisture station at Lake Cle Elum snow course continues to indicate a well primed soil mantle. This station, located at a low elevation, has been bare of snow for the last two months and precipitation which has occurred in this area has fallen in the form of rain.

Streamflow has been well below normal during the month of April which combined with the above normal precipitation has, in part, been responsible for the improved water supply outlook.

Forecasts of streamflow in the Yakima watershed can be found elsewhere in this report and range from a low of 43% of normal for the Yakima as measured near Tampico. These forecasts are all for the May-September period.

WALLA WALLA RIVER

The outlook for irrigation water supplies for the 1963 season has improved since that which was reported on April 1. A series of cool wet storms occurred during the month of April and have put a greater than normal amount of snow in the mountains at higher elevations with concurrent greater than normal precipitation in the lower elevations of the watershed. Forecast of streamflow for the Walla Walla River as measured near Milton is for a flow that is 64% of normal or 37,000 acre feet during the May-September period. Mill Creek as measured near

Walla Walla is expected to have a flow 58% or 13,000 acre feet during the same period. The above mentioned precipitation has wetted the soil to such an extent that the soil mantle profile as of the first of the month is near capacity and very close to what was measured two years ago at this time. The two soil moisture stacks in Oregon have a better moisture content than last year but the two in Washington have slightly less.

The one snow course, Tollgate, has a snowpack that is less than normal and less than last month but has not decreased as much as normally would be expected. Flow of the South Fork during the month of April was 13,000 acre feet or 72% of average. The Walla Walla as measured near Touchet had a flow during the same period that was 66% of normal.

LOWER COLUMBIA

Very little information is available from the Lower Columbia drainages. Ground measurements were made at the snow courses on the 29th and 30th and aerial observations were scheduled in the same period. Weather conditions have been such that is has been impossible to obtain the aerial readings of the snow stadia markers. Indications are that much precipitation has occurred since the measurements were made on the 29th and 30th from precipitation stations at the lower valley elevations. Although these late season storms put more snow on the mountains than is indicated by these measurements, it would be highly improbable that conditions would improve to any extent. Snowfall and valley precipitation that occurs this late in the season has little lasting effect over the watershed as a whole. Forecasts for the Lewis and Cowlitz Rivers are for flows 75% of normal for the Lewis as measured at Ariel and 65% for the Cowlitz at Castle Rock. These are flows of 760,000 and 1,420,000 acre feet, respectively.

PUGET SOUND

Very little information is obtained from the Puget Sound Drainages as of the first of May. The snow courses that have been measured indicate that conditions are still considerably below normal and considerably below last year at this time. A few of the higher Cascade stations in the Skagit River drainage indicate a better snowpack than last year but they too are still below normal. Valley precipitation in this area was normal or below. River flow of the Skagit was below normal as was generally experienced over the rest of the state.

OLYMPIC PENINSULA

None of the snow courses on the Olympic Peninsula are measured on May 1. Forecasts for the Dungeness River near Sequim is now for 113,000 acre feet or 76% of normal for the May-September period. This is the same percentagewise as was forecast last month. The information which was received late last month indicates a very poor snowpack and it is doubtful if it has improved to any degree since the measurements were taken on April 6. Precipitation in this area as measured by the station at Sequim was only 9% above normal in contrast to some areas that were 250% above normal.

STREAMFLOW FORECASTS - MAY 1963

The following summarized runoff forecasts are based principally on mountain snow cover and on the assumption that precipitation and temperature will be near average from the present time to the end of the forecast period. Appreciable deviations from normal of temperature and/or precipitation will correspondingly modify these forecasts.

Basin, Stream and Station	Forecast Runoff 1963	Seasonal Streamflow in Thousands of Acre-Feet						
		% 15-Yr. Avg.	Fore- cast Period	Measured Runoff 1962	Runoff 1961	15-Yr. Average 1960	1943-57	
<u>UPPER COLUMBIA BASIN</u>								
<u>Columbia River System</u>								
<u>Columbia River</u>								
at Grand Coulee <u>1/</u>	51850	85	May-Sep	54507	65715	56528	60753	
	41250	83	May-Jul	43150	55484	45463	49818	
	30000	82	May-Jun	31738	45178	31419	36679	
<u>Columbia River</u>								
bl. Priest Rapids Dam <u>1/</u>	54550	82	May-Sep	58866	71863	62127	66930	
	44000	80	May-Jul	46875	61055	50239	54981	
	31250	77	May-Jun	34528	49665	35019	40524	
<u>Columbia River</u>								
at The Dalles, Ore. <u>1/</u>	69600	75	May-Sep	77871	91017	80712	92296	
	55250	72	May-Jul	62212	77406	65484	76409	
	41750	72	May-Jun	47596	64014	47936	58214	
<u>Pend Oreille River System</u>								
<u>Pend Oreille River</u>								
bl. Box Canyon <u>1/</u>	11200	79	May-Sep	12003	13424	12112	14221	
	10000	78	May-Jul	10893	12511	10798	12880	
	7900	75	May-Jun	9448	11263	9086	10593	
<u>Kettle River System</u>								
<u>Kettle River</u>								
nr. Laurier	1345	81	May-Sep	1340	1829	1436	1663	
	1270	81	May-Jul	1254	1782	1380	1568	
	1120	80	May-Jun	1117	1695	1242	1396	
<u>Colville River</u>								
at Kettle Falls	87	85	May-Sep		161	127	102	
	76	85	May-Jul		145	110	89	
	67	86	May-Jun		130	99	78	

1/ Observed flow corrected for storage in any of the following reservoirs which are above the station: Kootenay Lake, Hungry Horse, Flathead Lake, Pend Oreille Lake, F. D. Roosevelt Lake, Lake Chelan, Coeur d'Alene Lake, Brownlee, Noxon Reservoir and pumpage at F. D. Roosevelt Lake.

Streamflow Forecasts - May 1963 (Cont'd)

Basin, Stream and Station	Forecast Runoff 1963	Seasonal Streamflow in Thousands of Acre-Feet						
		% Avg.	Fore- cast 15-Yr. Avg.	Measured 1962	Runoff 1961	Average 1960	15-Yr. 1943-57	
<u>Spokane River System*</u>								
Spokane River								
at Post Falls, Ida. <u>2/</u>	1610 1520 1410	76 74 74	May-Sep May-Jul May-Jun	1763	2182 2120 2022	1818 1722 1611	2148 2051 1894	
<u>Okanogan River System**</u>								
Similkameen River								
nr. Nighthawk	930 870 750	61 61 63	May-Sep May-Jul May-Jun	992 909 763	1411 1350 1230	1117 1045 902	1533 1419 1196	
Okanogan River at Oroville <u>3/</u>								
	390 375 325	58 61 58	May-Sep May-Jul May-Jun		601 585 542	614 522 475	669 618 560	
Okanogan River nr. Tonasket								
	1060 960 820	60 60 62	May-Sep May-Jul May-Jun	1084 970 807	1560 1448 1300	1231 1109 947	1774 1593 1322	
Salmon Lake - Conconully Res. - Inflow	11	48	Apr-Jul	6	16	12	23	
<u>Methow River System**</u>								
Methow River								
nr. Pateros	720 670 550	69 70 68	May-Sep May-Jul May-Jun	545 482 395	990 943 857	835 770 635	1037 961 806	
<u>Chelan River System</u>								
Chelan River								
at Chelan <u>4/</u>	790 700 530	68 69 68	May-Sep May-Jul May-Jun		1204 1092 903	1059 941 687	1169 1021 783	
Stehokin River at Stehokin								
	600 500 370	73 72 73	May-Sep May-Jul May-Jun	632 517 370	898 781 630	772 659 463	818 694 508	

* Forecasts made by Morlan W. Nelson and J. Alden Wilson, Soil Conservation Service, Boise, Idaho.

** These forecasts are based in part upon base flow data especially prepared and furnished for the purpose by the U. S. Geological Survey.

2/ Observed flow corrected for storage in Coeur d'Alene Lake and diversions by Spokane Valley Farms Company and Rathdrum Prairie Canals.

3/ Observed flow corrected for storage, diversions and evaporation.

4/ Observed flow corrected for storage in Lake Chelan.

Streamflow Forecasts - May 1963 (Cont'd)

Basin, Stream and Station	Forecast Runoff 1963	Seasonal Streamflow in Thousands of Acre-Feet					15-Yr. Average 1943-57		
		% Avg.	Fore- 15-Yr. cast Period	Measured Runoff 1962	Runoff 1961	1960			
<u>Wenatchee River System</u>									
<u>Wenatchee River</u>									
at Plain	775	65	May-Sep	1214	1027	1194			
	700	65	May-Jul	1122	927	1072			
	560	68	May-Jun	943	700	824			
Wenatchee River at Peshastin	1000	61	May-Sep	1652	1342	1649			
	910	61	May-Jul	1536	1225	1491			
	725	63	May-Jun	1303	946	1154			
Stemilt Basin nr. Wenatchee	98*		May-Sep	146*	128*	117*	--		
<u>Yakima River System</u>									
<u>Yakima River</u>									
nr. Martin 5/	73	55	May-Sep	75	120	100	132		
	65	54	May-Jul	67	113	91	121		
	57	56	May-Jun	55	104	82	101		
Yakima River at Cle Elum 6/	425	50	May-Sep	818	631	847			
	375	49	May-Jul	757	565	770			
	340	53	May-Jun	674	488	642			
Yakima River nr. Parker 7/	650	43	May-Sep	1462	942	1504			
	680	46	May-Jul	1484	950	1484			
	660	50	May-Jun	1408	913	1315			
Kachess River nr. Easton 8/	50	45	May-Sep	71	105	80	111		
	46	43	May-Jul	65	101	75	106		
	44	48	May-Jun	56	93	69	91		
Cle Elum River nr. Roslyn 9/	230	52	May-Sep	312	441	325	443		
	210	52	May-Jul	281	410	298	404		
	170	52	May-Jun	227	357	250	328		

* Thousands of Miners' inches.

5/ Observed flow corrected for storage in Lake Keechelus.

6/ Observed flow corrected for storage in Keechelus, Kachess and Cle Elum Lakes and diversion by Kittitas Canal.

7/ Observed flow corrected for storage in Keechelus, Kachess, Cle Elum, Bumping and Rimrock Lakes and diversion by Roza, Union Gap, New Reservation, Old Reservation and Sunnyside Canals.

8/ Observed flow corrected for storage in Lake Kachess.

9/ Observed flow corrected for storage in Lake Cle Elum

Streamflow Forecasts - May 1963 (Cont'd)

Basin, Stream and Station	Forecast Runoff 1963	Seasonal Streamflow in Thousands of Acre-Feet					
		% Runoff 1963	Fore- cast 15-Yr. Avg.	Fore- cast Period	Measured Runoff 1962	Runoff 1961	15-Yr. Average 1960-57
<u>Yakima River System (Cont'd)</u>							
Bumping River nr. Nile <u>10/</u>	86 79 67	60 60 65	May-Sep May-Jul May-Jun		149 139 118	107 99 85	144 131 103
American River nr. Nile	70 64 53	59 59 61	May-Sep May-Jul May-Jun		132 123 105	89 81 67	118 109 87
Tieton River at Tieton Dam <u>11/</u>	147 119 96	62 60 64	May-Sep May-Jul May-Jun		240 201 161	186 153 119	237 199 151
Naches River nr. Naches <u>12/</u>	445 390 335	55 53 56	May-Sep May-Jul May-Jun		844 764 657	587 524 442	809 729 596
Ahtanum Creeks nr. Tampico <u>13/</u>	30 27 24	71 71 75	May-Sep May-Jul May-Jun		48 43 38	31 27 24	42 38 32

LOWER COLUMBIA BASIN

Lower Columbia River System

Mill Creek nr. Walla Walla	13 10 8	58 56 53	May-Sep May-Jul May-Jun	16 12 10	18 14 12	18 13 11	22 18 15
Lewis River at Ariel <u>14/</u>	760 620 520	75 72 74	May-Sep May-Jul May-Jun	765 622 530	875 732 635	1018 853 746	1011 857 703
Cowlitz River at Castle Rock <u>15/</u>	1420 1160 950	65 62 64	May-Sep May-Jul May-Jun	1820 1509 1214	2097 1810 1524	2151 1829 1550	2180 1863 1477

11/ Observed flow corrected for storage in Rimrock Lake.

12/ Observed flow corrected for storage in Bumping and Rimrock Lakes and diversion by Tieton, Selah Valley, Wapatox Canals and City of Yakima.

13/ Observed flow of North and South Forks (combined).

14/ Observed flow corrected for storage in Lake Merwin, Yale and Swift Reservoirs.

15/ Observed flow corrected for storage in Mayfield Reservoir.

Streamflow Forecasts - May 1963 (Cont'd)

Basin, Stream and Station	Forecast Runoff 1963	Seasonal Streamflow in Thousands of Acre-Feet					
		% Avg.	Fore- cast 15-Yr. Avg.	Measured Runoff 1962	Runoff 1961	Average 1960	15-Yr. 1943-57
		Period					

OLYMPIC PENINSULA

Dungeness River System

Dungeness River

nr. Sequim	113	76	May-Sep	109	175	132	149
	91	76	May-Jul	85	145	110	119
	64	76	May-Jun	59	104	82	84

RESERVOIR STORAGE - 1000 Acre Feet

BASIN or STREAM	RESERVOIR <u>1/</u>	USABLE CAPACITY	Measured (May 1)			Normal*
			1963	1962	1961	
<u>COLUMBIA</u>						
Spokane	Coeur d'Alene Lake	889.0	181.8	371.3	206.5	356.7
Columbia	Franklin D. Roosevelt Lake	5232.0	2795.0	2662.0	2686.0	3853.3
Columbia	Banks Lake <u>2/</u>	761.8	219.5	430.6	471.9	--
Okanogan	Conconully Reservoir	13.0	6.6	6.6	7.6	8.9
Okanogan	Salmon Lake	10.5	5.5	7.4	8.9	9.1
Chelan	Lake Chelan	676.1	357.9	278.4	124.3	251.8
<u>YAKIMA</u>						
Yakima	Keechelus Lake	157.8	157.0	146.9	120.9	108.8
Kachess	Kachess Lake	239.0	241.2	227.0	199.7	196.7
Cle Elum	Lake Cle Elum	436.9	416.4	400.6	379.0	326.6
Bumping	Bumping Lake	33.7	34.3	32.0	21.5	21.7
Tieton	Rimrock Lake	198.0	198.1	189.2	171.5	148.4
<u>PUGET SOUND</u>						
Skagit	Ross Reservoir	1202.9	1094.9	810.8	943.0	290.2
Skagit	Diablo Reservoir	90.6	86.7	82.9	85.0	86.1
Skagit	Gorge Reservoir	9.8	7.5	8.2	--	--

1/ Based on Active Storage.2/ Less than 15-year record in period 1943-57.

* 15-year average 1943-57.

SOIL MOISTURE - MAY

Drainage Basin and Station	Number	Elev.	Profile (Inches) : Soil Moisture Content			
			Depth	Total Capacity : 1963	(Inches) as of May 1 1962	1961
<u>CRAB CREEK</u>						
Creston-Kunz	18B1M	2440	48	13.6	11.00	11.53
Govan	18B2M	2100	48	13.6	11.91	12.36
Jack Woods	18B3M	2600	48	13.6	9.99	10.35
Krause	18B4M	2440	48	13.6	9.55	9.19
Sheffels	18B5M	2360	48	13.6	7.97	7.06
Wheatridge	18B6M	2200	48	13.6	8.73	8.14
<u>OKANOGAN</u>						
Trout Creek	3-M	3600	48	7.6	3.77*	3.25*
<u>YAKIMA</u>						
Lake Cle Elum	21B14M	2200	48	12.8	12.30	12.30
<u>WALLA WALLA</u>						
Couse	17C3M	3650	48	11.1	9.63	10.56
Helmers	17C2M	4400	48	12.0	11.66	11.40

* Previous month's measurement

FALL SOIL MOISTURE

Drainage Basin and Station	Number	Elev.	Profile (Inches) : Soil Moisture Content			
			Depth	Total Capacity : 1962	(Inches) as of Oct. 1 1961	1960
<u>CRAB CREEK</u>						
Creston-Kunz	18B1M	2440	48	13.6	9.40	4.25
Govan	18B2M	2100	48	13.6	9.95	5.60
Jack Woods	18B3M	2600	48	13.6	7.06	7.35
Krause	18B4M	2440	48	13.6	9.47	4.99
Sheffels	18B5M	2360	48	13.6	6.69	3.67
Wheatridge	18B6M	2200	48	13.6	7.49	4.09
<u>OKANOGAN</u>						
Trout Creek	3-M	3600	48	7.3	2.80	3.00
<u>YAKIMA</u>						
Lake Cle Elum	21B14M	2200	48	12.8	6.80	9.50
<u>WALLA WALLA</u>						
Couse	17C3M	3650	48	11.1	7.20	6.60
Helmers	17C2M	4400	48	12.0	7.60	6.90

PRECIPITATION 1/

Division Averages and Departures

DRAINAGE DIVISIONS	FALL		WINTER		SPRING	
	Sept.-Nov. 1962 Observed	2/ Departure	Dec. '62-Feb. '63 Observed	2/ Departure	Mar.-April '63 Observed	2/ Departure
Columbia in Canada	6.18	+ 0.41	7.33	- 0.95	2.59	- 0.26
Pend Oreille - Spokane	10.30	+ 1.47	8.97	- 2.51	5.52	+ 0.53
Northeastern Washington	6.34	+ 1.12	4.43	- 2.04	3.64	+ 0.78
Southeastern Washington	7.14	+ 1.24	5.79	- 1.75	4.30	+ 0.59
Central Washington	14.27	+ 1.18	11.75	- 9.68	6.15	- 0.48
North Central Washington	3.23	+ 0.04	2.45	- 1.05	2.94	+ 1.30
Northwest Slope Cascades	24.41	+ 1.88	23.11	- 8.59	11.97	- 1.30
Southwest Slope Cascades	23.63	+ 6.82	15.29	- 9.42	10.86	+ 1.60
Blue Mountains, Oregon	6.51	+ 1.72	5.13	- 2.34	4.34	+ 0.85
Lower Columbia in Oregon	6.56	+ 1.22	5.39	- 2.60	3.67	+ 0.81

Northeastern Washington - Lower Spokane, Colville, Sanpoil and Lower Kettle Drainages.

Southeastern Washington - Touchet, Tucannon and Palouse Drainages.

Central Washington - Yakima, Wenatchee and Chelan Drainages.

North Central Washington - Methow and Okanogan Drainages.

Northwest Slope Cascades - Puget Sound Drainages.

Southwest Slope Cascades - Lower Columbia Drainages.

1/ - Preliminary analysis by U. S. Weather Bureau from data furnished by Meteorological Services of Canada and U. S. Weather Bureau.

2/ - Departure from 15-year (1943-57) drainage division average.

Note - Precipitation shown in inches.

APPENDIX 1

SNOW DATA MAY 1, 1963

DRAINAGE BASIN and SNOW COURSE	No.	Elev.	SNOW COVER MEASUREMENT					
			1963		: P a s t R e c o r d			
			Date of Survey (In.)	Snow Depth (In.)	Water Content (In.)	Water Content (In.)	1943-57	1961

MID-MONTH SURVEYS

Snow Surveys made on or about April 15, 1963

WENATCHEE RIVER

Blewett Pass No. 2	20B 2	4270	4/15	0	0.0	8.8	9.5	14.7*
Leavenworth R. S.	20B 17	1127	4/15	0	0.0	--	--	--
Stevens Pass	21B 1	4070	4/12	77	30.9	45.5	56.3	57.0*

YAKIMA RIVER

#Blewett Pass No. 2	20B 2	4270	4/15	0	0.0	8.8	9.5	14.7*
Bumping Lake	21C 8	3450	4/13	11	4.0	9.0	13.5	13.8*
Lake Cle Elum	21B 14M	2200	4/13	0	0.0	0.0	0.0	3.2*
#Stempede Pass	21B 10	3000	4/16	56	23.7	39.1	47.2	53.6*
Tunnel Avenue	21B 8	2450	4/13	4	2.6	14.4	24.8	25.5*
White Pass	20C 9	4500	4/15	49	20.1	27.8	33.4	38.6*
White Pass (Ea.Side)	21C 28	4500	4/13	36	13.6	21.4	26.1	36.6*
White Pass (Leach Lk)	21C 27	4500	4/15	39	12.5	23.2	28.0	--
Olallie Meadows	21B 2	3625	4/12	46	20.8	39.1	42.8	56.5*

COWLITZ RIVER

#White Pass	20C 9	4500	4/15	49	20.1	27.8	33.4	38.6*
#White Pass(Ea.Side)	21C 28	4500	4/13	36	13.6	21.4	26.1	36.6*
#White Pass(Leach Lk)	21C 27	4500	4/15	39	12.5	23.2	28.0	--

GREEN RIVER

Stampede Pass	21B 10	3000	4/16	56	23.7	39.1	47.2	53.6*
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SNOQUALMIE RIVER

Olallie Meadows	21B 2	3625	4/12	46	20.8	39.1	42.8	56.5*
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SKYKOMISH RIVER

#Stevens Pass	21B 1	4070	4/12	77	30.9	45.5	56.3	57.0*
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* Adjusted 1943-57 average

Not located directly on this drainage

APPENDIX 2

DRAINAGE BASIN and SNOW COURSE	No.	SNOW COVER MEASUREMENT					
		1963		:Past Record			
		Date of Survey (In.)	Snow Depth (In.)	Water Content (In.)	Water Content (In.)	1962	1961
							1943-57

Snow Surveys made on or about April 15, 1963 (Cont'd)

BAKER RIVER

Dock Butte 1/	21A 11A	3800	4/18	98	46.1	56.3	--	--
Jasper Pass 1/	21A 6A	5400	4/18	162	72.9	56.3	--	--
Marten Lake 1/	21A 9A	3600	4/18	111	51.1	55.9	--	--
#Panorama	21A 5	4300	4/16	134	63.6	65.5	--	--
Rocky Creek 1/	21A 12A	2100	4/18	0	0.0	10.6	--	--
Schreibers Meadow 1/	21A 10A	3400	4/18	58	27.3	41.3	--	--
S.F. Thunder Cr. 1/	21A 14A	2200	4/18	0	0.0	0.0	--	--
Watson Lakes 1/	21A 8A	4500	4/18	87	40.9	45.2	--	--

NOOKSACK RIVER

Panorama	21A 5	4300	4/16	134	63.6	65.5	--	--
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Not directly on this drainage

1/ Snow water equivalent estimated from aerial stadia observations

APPENDIX 3

SNOW DATA MAY 1, 1963

DRAINAGE BASIN and SNOW COURSE	No.	Elev.	SNOW COVER MEASUREMENT					
			1963		:Past Record			
			Date of Survey	Snow Depth (In.)	Water Content (In.)	Water Content (In.)	1943-57	
								Avg.

UPPER COLUMBIA DRAINAGEPEND OREILLE RIVER

Baree Creek	15B 11	5500	5/1	72	31.4	41.8	53.0	48.2*
Benton Meadow	16A 2	2344	4/29	0	0.0	0.0	0.0	0.0
Benton Spring	16A 3	4900	4/29	19	7.8	12.0	17.9	17.8
Boyer Mountain	17A 2	5250	4/29	44	17.4	23.6	30.2	21.3*
Brush Creek	14A 4	5000	4/26	21	8.2	8.4	12.6	10.5*
Bunchgrass Meadow	17A 1	5000	4/26	57	22.5	23.4	36.3	27.0
Hoodoo Creek	15C 1	6200	4/30	83	35.5	44.5	56.2	46.9*
Lookout	15B 2	5250	4/29	62	25.2	30.8	37.8	34.0*
Mosquito Ridge 1/	16A 4A	5110	Not Measured		31.6	39.4	33.5*	
Nelson	Canada	3050	4/29	0	0.0	6.2	9.9	--
Smith Creek	16A 1	4800	5/1	76	30.7	39.0	56.7	46.3*
Winchester Creek	17A 3	2970	4/28	0	0.0	1.5	0.0	--

KETTLE RIVER

Barnes Creek	Canada	5300	4/30	43	17.3	15.9	23.0	--
Boulder Road	18A 2	1450	4/29	0	0.0	0.0	0.0	--
Butte Creek	18A 3	4070	4/29	0	0.0	5.0	7.7	--
Cabin Creek	18A 8	3170	4/29	0	0.0	0.0	0.0	--
Carmi	Canada	4100	Late Report		New Course			
Farron	Canada	4000	4/29	6	2.1	8.3	12.6	--
Goat Creek	18A 4	3595	4/29	0	0.0	0.0	0.0	--
Monashee Pass	Canada	4500	4/30	29	11.2	11.6	13.2	--
Snow Caps Creek	18A 5	2150	4/29	0	0.0	0.0	0.0	--
Snow Caps Trail	18A 6	2720	4/29	0	0.0	0.0	0.0	--
Summit G.S.	18A 7	4600	4/29	9	2.9	5.8	8.0	--

SPOKANE RIVER

Copper Ridge	16B 2	4800	4/30	24	9.0	23.5	22.2	27.8
Forty-nine Meadows	15B 3	5000	4/28	41	17.0	24.4	32.8	34.2*
4th of July Summit	16B 3	3100	4/29	0	0.0	0.0	--	--
#Lookout	15B 2	5250	4/29	62	25.2	30.8	37.8	34.0*
Lower Sands Creek	16B 1	3400	4/30	6	2.2	14.1	8.2	12.6*
#Mosquito Ridge 1/	16A 4A	5110	Not Measured		31.6	39.4	33.5*	
Outlaw	15B 12	3750	4/30	0	0.0	6.2	6.8	--

Not located directly on this drainage

* Adjusted 1943-57 average

APPENDIX 4

DRAINAGE BASIN and SNOW COURSE	No.	Elev.	SNOW COVER MEASUREMENT					
			Date of Survey	Snow Depth (In.)	Water Content (In.)	:P a s t R e c o r d		
						1963	1962	1961

OKANOGAN RIVER

Aberdeen Lake	Canada	4300	4/29	0	0.0	0.0	1.0	1.4**
Blackwall Mountain	Canada	6250	5/2	80	35.3	27.7	43.7	--
Bouleau Creek	Canada	5000	4/27	13	4.0	7.4	8.6	--
Brookmere	Canada	3200	5/2	0	0.0	2.0	5.3	6.0**
Clarke 1/	19A 8a		4/28	77	28.9	New Course		
#Freezeout Meadows	20A 2	5000	4/26	44	17.2	14.8	29.5	34.1*
Hamilton Hill	Canada	4900	4/29	22	8.6	5.6	11.7	--
#Harts Pass	20A 5	6500	4/26	101	44.2	36.6	50.7	50.2
Lost Horse Mountain	Canada	6300	5/1	26	7.5	8.2	8.6	--
McCulloch	Canada	4200	4/29	3	0.8	2.8	1.6	2.8**
Missezula Mountain	Canada	5100	5/2	0	0.0	2.6	6.3	--
Mission Creek	Canada	6000	4/29	52	18.4	17.8	22.3	21.3**
Monashee Pass	Canada	4500	4/30	29	11.2	11.6	13.2	--
Muckamuck 1/	19A 9a		4/28	60	22.5	New Course		
Mutton Creek No. 1	19A 1	5700	4/30	19	8.0	1.1	8.8	8.4*
Mutton Creek No. 2	19A 4	6000	4/30	39	14.1	4.4	13.3	13.3*
Nickel Plate Mtn.	Canada	6200	4/30	21	5.1	7.1	7.9	--
Postill Lake	Canada	4500	4/30	12	3.4	4.4	6.9	7.0**
Rusty Creek	19A 3	4000	5/1	0	0.0	0.5	0.0	1.2*
Salmon Meadows	19A 2	4500	4/30	10	3.5	1.0	1.7	4.0*
Silver Star Mountain	Canada	6050	4/30	58	20.0	15.8	25.6	--
Starvation Mountain 1/	19A 10a	6750	4/28	81	30.4	New Course		
Trout Creek	Canada	4700	4/30	8	2.1	1.8	3.7	5.0**

METHOW RIVER

Harts Pass	20A 5	6500	4/26	101	44.2	36.6	50.7	50.2
#Mutton Creek No. 1	19A 1	5700	4/30	19	8.0	1.1	8.8	8.4*
#Mutton Creek No. 2	19A 4	6000	4/30	39	14.1	4.4	13.3	13.3*
#Rusty Creek	19A 3	4000	5/1	0	0.0	0.5	0.0	1.2*
#Salmon Meadows	19A 2	4500	4/30	10	3.5	1.0	1.7	4.0*

CHELAN LAKE BASIN

Rainy Pass	20A 9	4780	4/26	77	33.3	31.0	45.4	44.3*
Safety Harbor	20A 30	6000	Late Report			New Course		

ENTIAT RIVER

Brief	20B 19	1600	4/26	0	0.0	0.0	0.0	--
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Not located directly on this drainage

* Adjusted 1943-57 average

** Average for years of record

1/ Snow water equivalent estimated from aerial stadia observation

APPENDIX 5

DRAINAGE BASIN and SNOW COURSE	No.	Elev.	SNOW COVER MEASUREMENT						
			Date of Survey	Snow Depth (In.)	Water Content (In.)	:P a s t R e c o r d			1943-57
						1963	1962	1961	
<u>WENATCHEE RIVER</u>									
Berne-Mill Creek	21B 23	2925	4/29	0	0.0	6.5	15.5	--	
Blewett Pass No. 2	20B 2	4270	4/29	0	0.0	2.3	6.1	10.7*	
Chiwaukum G. S.	20B 16	1810	4/29	0	0.0	0.0	0.0	--	
#Fish Lake	21B 4	3371	4/27	24	8.4	19.0	26.6	27.0*	
Lake Wenatchee	20B 5	1970	4/29	0	0.0	0.0	0.0	--	
Leavenworth R. S.	20B 17	1127	4/29	0	0.0	0.0	0.0	--	
Merritt	20B 18	2140	4/29	0	0.0	0.0	0.0	--	
Stevens Pass	21B 1	4070	4/29	73	29.3	39.4	55.5	51.0*	
<u>SQUILCHUCK CREEK</u>									
Beehive Springs	20B 3	4400	4/25	0	0.0	0.0	0.0	1.4*	
Scout-A-Vista	20B 4	3400	4/25	0	0.0	0.0	0.0	0.0*	
<u>STEMILT CREEK</u>									
Jump-Off	20B 8	4450	4/26	0	0.0	0.0	0.0	--	
Stemilt Slide	20B 6	5000	4/26	13	4.8	0.0	3.2	--	
Upper Wheeler	20B 7	4400	4/26	0	0.0	0.0	0.0	--	
<u>YAKIMA RIVER</u>									
Ahtanum R. S.	21C 11	3100	5/1	0	0.0	0.0	0.0	0.0*	
Big Boulder Creek	21B 9	3200	4/27	0	0.0	0.0	4.1	6.8*	
#Blewett Pass No. 2	20B 2	4270	4/29	0	0.0	2.3	6.1	10.7*	
Bumping Lake	21C 8	3450	4/29	4	1.5	4.9	9.2	10.5*	
Fish Lake	21B 4	3371	4/27	24	8.4	19.0	26.6	27.0*	
Lake Cle Elum	21B 14M	2200	4/29	0	0.0	0.0	0.0	0.6*	
Morse Lake	21C 17	5400	4/29	106	43.7	63.0	76.8	68.0*	
#Olallie Meadows	21B 2	3625	4/29	36	17.3	33.1	46.3	51.5*	
#Satus Pass	20D 1	4030	4/29	0	0.0	0.0	0.0	--	
#Stampede Pass	21B 10	3000	5/3	63	25.6	34.6	46.7	47.4*	
Tunnel Avenue	21B 8	2450	4/29	0	0.0	8.9	20.6	19.2*	
White Pass	21C 9	4500	4/28	47	20.2	24.4	32.7	36.9*	
White Pass (Ea. Side)	21C 28	4500	4/29	33	14.5	20.3	28.5	37.9*	
White Pass (Leach Lk)	21C 27	4500	4/28	37	14.1	19.0	26.9	--	

Not located directly on this drainage

* Adjusted 1943-57 average

APPENDIX 6

DRAINAGE BASIN and SNOW COURSE	No.	Elev.	SNOW COVER MEASUREMENT					
			1963		:Past Record			
			Date of Survey	Snow Depth (In.)	Water Content (In.)	Water Content (In.)	1943-57	
AHTANUM CREEK								
Ahtanum R. S.	21C 11	3100	5/1	0	0.0	0.0	0.0	0.0*
<u>LOWER COLUMBIA DRAINAGE</u>								
<u>KLICKITAT RIVER</u>								
Satus Pass	20D 1	4030	4/29	0	0.0	0.0	0.0	--
<u>WHITE SALMON RIVER</u>								
Cultus Creek	21C 12	4000	4/30	54	23.0	43.6	48.0	52.1*
#Surprise Lakes	21C 13A	4250	4/30	55	23.9	41.0	56.8	55.1*
<u>WIND RIVER</u>								
Oldman Pass	21D 19	3100	4/29	5	2.0	0.0	0.0	10.2*
<u>LEWIS RIVER</u>								
Blue Lake 1/	21C 22a	4800	Late Report		69.9	--	--	
Bob's Trail	21C 21	2200	4/30	0	0.0	0.0	0.0	--
Calamity Ridge 1/	22D 1a	2500	Late Report		0.0	--	--	
Council Pass 1/	21C 18a	4200	Late Report		24.2	--	--	
#Cultus Creek	21C 12	4000	4/30	54	23.0	43.6	48.0	52.1*
Divide Meadow 1/	21C 29a	5600	Late Report		55.3	--	--	
Grand Meadow	21C 25	3500	4/30	21	9.5	15.2	22.2	--
Lone Pine Shelter	21C 26	3800	4/30	52	23.1	31.4	42.7	--
#Mosquito Meadows	21C 19	4100	4/30	52	23.4	36.1	44.8	48.4*
Marble Mountain 1/	22C 5a	3200	Late Report		New Course			
Muddy River	22C 3	1400	4/29	0	0.0	0.0	0.0	--
Oldman Pass	21D 19	3100	4/29	5	2.0	0.0	0.0	10.2*
Plains of Abraham 1/	22C 1a	4400	Late Report		61.1	72.1	81.6*	
Smith Creek Road	22C 4	2100	4/29	0	0.0	0.0	0.0	--
Spencer Meadow 1/	21C 20a	3400	Late Report		2.0	--	--	
Surprise Lakes	21C 13A	4250	4/30	55	23.9	41.0	56.8	55.1*
Table Mountain 1/	21C 24a	4200	Late Report		39.2	--	--	
Timbered Peak 1/	21D 18a	3000	Late Report		0.5	--	--	

Not located directly on this drainage

* Adjusted 1943-57 average

1/ Snow water equivalent estimated from aerial stadia observation

APPENDIX 7

DRAINAGE BASIN and SNOW COURSE	No.	Elev.	SNOW COVER MEASUREMENT						
			1963		: Past Record			Date of Survey (In.)	Water Content (In.)
			Snow Depth (In.)	Content (In.)	1962	1961	1943-57 Avg.		
<u>COWLITZ RIVER</u>									
Mosquito Meadows	21C 19	4100	4/30	52	23.4	36.1	44.8	48.4*	
Pig Tail Peak	21C 33	5900	4/28	105	45.0	New Course			
Plains of Abraham 1/	22C 1a	4400	Late Report		61.1	72.1	81.6*		
#White Pass	21C 9	4500	4/28	47	20.2	24.4	32.7	36.9*	
#White Pass(Ea.Side)	21C 28	4500	4/29	33	14.5	20.3	28.5	37.9*	
#White Pass(Leach Lk)	21C 27	4500	4/28	37	14.1	19.0	26.9	--	
<u>PUGET SOUND DRAINAGE</u>									
<u>WHITE RIVER</u>									
#Morse Lake	21C 17	5400	4/29	106	43.7	63.0	76.8	68.0*	
<u>GREEN RIVER</u>									
Stampede Pass	21B 10	3000	5/3	63	25.6	34.6	46.7	47.4*	
<u>SNOQUALMIE RIVER</u>									
Olallie Meadows	21B 2	3625	4/29	36	17.3	33.1	46.3	51.5*	
<u>SKYKOMISH RIVER</u>									
#Stevens Pass	21B 1	4070	4/29	73	29.3	39.4	55.5	51.0*	
<u>SKAGIT RIVER</u>									
Beaver Creek Trail	21A 4	2200	4/26	0	0.0	0.0	0.0	8.1*	
Beaver Pass	21A 1	3680	4/26	35	13.7	18.7	31.4	37.1*	
Devils Park	20A 4	5900	4/26	86	38.4	39.5	53.6	45.5*	
Freezeout Cr. Trail	20A 1	3500	4/26	2	0.8	0.4	5.6	11.2*	
Freezeout Meadows	20A 2	5000	4/26	44	17.2	14.8	29.5	34.1*	
#Harts Pass	20A 5A	6500	4/26	101	44.2	36.6	50.7	50.2	
Lake Hozomeen	21A 2	2600	4/27	0	0.0	0.0	0.0	9.2*	
Meadow Cabins	20A 8	1900	4/26	0	0.0	0.0	0.0	2.4*	
#Rainy Pass	20A 9	4780	4/26	77	33.3	31.0	45.4	44.3*	
Thunder Basin	20A 7	4200	4/26	34	14.1	17.8	26.7	29.7*	

Not located directly on this drainage

* Adjusted 1943-57 average

1/ Snow water equivalent estimated from aerial stadia observation

APPENDIX 8

DRAINAGE BASIN and SNOW COURSE	No.	Elev.	SNOW COVER MEASUREMENT					
			1963		: P a s t R e c o r d		Date of Survey (In.)	Water Content (In.)
			Snow Depth (In.)	Content (In.)				
<u>BAKER RIVER</u>								
Dock Butte	21A 11A	3800	4/28	95	46.1	62.1	82.0	--
Easy Pass	21A 7A	5200	4/28	157	79.8	77.3	100.0	--
Jasper Pass	21A 6A	5400	4/28	163	76.6	82.3	114.4	--
Koma Kulshan	21A 17	800	4/28	0	0.0	0.0	0.0	--
Marten Lake	21A 9A	3600	4/28	102	48.5	67.4	79.7	--
#Panorama	21A 5	4300	5/1	137	62.0	76.8	92.3	--
Rocky Creek	21A 12A	2100	4/28	0	0.0	0.0	7.4	--
Schreibers Meadow	21A 10A	3400	4/28	78	36.6	52.6	59.8	--
S.F. Thunder Creek	21A 14A	2200	4/28	0	0.0	0.0	0.0	--
Sulphur Creek	21A 13	1600	4/28	0	0.0	0.0	0.0	--
Three Mile Creek	21A 15	1600	4/28	0	0.0	0.0	0.0	--
Watson Lakes	21A 8A	4500	4/27	95	44.5	59.8	83.1	--
<u>NOOKSACK RIVER</u>								
Panorama	21A 5	4300	5/1	137	62.0	76.8	92.3	--

Not directly on this drainage

Agencies Assisting with Snow Surveys

GOVERNMENT AGENCIES

Canada:

Department of Lands, Forests and Water Resources,
Water Resources Service, British Columbia

States:

Washington State Department of Conservation
Washington State Department of Natural Resources

Federal:

Department of the Army
Corps of Engineers
U. S. Department of Agriculture
Forest Service
U. S. Department of Commerce
Weather Bureau
U. S. Department of the Interior
Bonneville Power Administration
Bureau of Reclamation
Geological Survey
National Park Service

PUBLIC AND PRIVATE UTILITIES

Chelan County P.U.D.
Pacific Power and Light Company
Puget Sound Power and Light Company
Washington Water Power Company

OTHER PUBLIC AGENCIES

Okanogan Irrigation District

MUNICIPALITIES

City of Walla Walla
City of Tacoma
City of Seattle

*Other organizations and individuals furnish valuable information for
snow survey reports. Their cooperation is gratefully acknowledged.*

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